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DETECTING COTTON FLEAHOPPER MOVEMENT INTO FIELDS WITH STICKY TRAPS

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Abstract

Studies initiated in 2002 to determine the feasibility of using traps to detect cotton fleahopper movement into cotton were continued in 2003. Malaise traps and two colors of sticky traps (yellow, white) were evaluated in five cotton fields. Both colors of sticky traps were positioned at three heights (ground level, 1, and 2 m above the soil surface) on the field border, and in the field interior just above the plant canopy on the 30th row. Malaise traps were positioned only on the field border. Captures by malaise traps were substantially higher than the previous year, but were still inconsistent as a result of trap blockage by large insects or spider webbing. These occurrences probably limit the value of malaise traps for monitoring fleahopper movement. Sticky traps, however, show considerable promise for this use. In general, infield sticky traps captured more fleahoppers than border traps, and yellow sticky traps tended to capture more fleahoppers than white traps, regardless of trap location. Differences in captures between trap colors and heights were less pronounced than in 2002, but peaks in captures at the 2-m trap height appeared to be related to discrete mass movement events of fleahoppers. Our results suggest sticky traps placed in the field interior are more useful for detecting the presence of fleahoppers in cotton fields, while traps at 2-m height on the field border may be useful for detecting mass migration events.

Introduction

The cotton fleahopper, *Pseudatomoscelis seriatus* (Reuter), prefers wild weed hosts (Reinhard 1926, Holtzer and Sterling 1980), but often migrates to cotton as weed hosts senesce (Almand et al. 1976). Currently, cotton producers rely exclusively on insecticide treatments to control fleahoppers, usually making two or more early-season applications. Although treatment thresholds and effective insecticides exist, current thresholds are controversial and many producers consider fleahopper scouting methods too laborious and time-consuming to be of practical use. Consequently, many producers do not scout for cotton fleahoppers, or scout infrequently, and instead base treatment decisions on other factors (e.g., prior experiences, crop phenology, or the need to treat for boll weevils). Because the timing and intensity of fleahopper migration into cotton is variable, many insecticide applications intended for fleahoppers may be mistimed or unnecessary. Field studies initiated in 2002 examined the potential of using sticky or malaise traps to detect mass movements of fleahoppers into cotton fields. Herein, we present data from a continuation of this study in 2003.

Materials and Methods

Cotton fleahoppers were monitored in five fields using procedures identical to those reported by Suh et al. (2003). Two of the fields were located in Burleson Co., two in Robertson Co., and one in Dallas Co., TX. Border traps were arranged in four sets along one edge of each field. Each set consisted of yellow Pherocon AM sticky traps (Trécé, Salinas, CA) set at ground level, 1 m, and 2 m above the soil surface on a single support (PVC pipe slipped over electrical conduit), white sticky traps (bottoms of Pherocon 1C wing traps, Trécé, Salinas, CA) at these same heights on another support, and a white nylon-screen malaise trap centered between the sticky trap supports. Sticky traps were folded in half around the PVC pipe and ends were stapled. Each trap was oriented so that one side of the trap faced directly outward from the field. Sticky traps placed at ground level were supported by the soil surface and were restrained from rotating by a wire placed in the soil. Sticky traps at the 1- and 2-m heights were held in place by passing a nail through the traps and PVC pipe. Sticky trap supports within each set were separated by 4 m, and trap sets were spaced 15 m apart. Each malaise trap was positioned with the opening facing away from the field, and the capture container was equipped with a kill strip (18% Dichlorovos [w/w], Plato Industries, Houston, TX). Traps were placed on the prevailing upwind side of fields. Four pairs of sticky traps were also placed on the 30th row inward from the border traps. Each pair consisted of a single yellow and white sticky trap on separate supports, and the traps were maintained 5-10 cm above the plants. Trap supports were spaced and constructed similar to those of border traps, but were shorter to prevent interference with equipment.

Traps were serviced twice weekly from the time plants were approximately 2-leaf stage until first-bloom. At each servicing, sticky traps were removed from the supports and wrapped individually in clear plastic wrap. Capture containers of malaise traps were removed, closed with a stopper, and placed in a sealable plastic bag. Sticky traps and malaise capture containers were replaced as existing traps were removed. Because of concern for possible position effects within trap sets, sticky trap color was randomly assigned to positions (left or right) with the constraint that each trap color occurred in each position with equal frequency. Cotton fleahoppers on sticky traps and in malaise capture containers were counted under a dissecting microscope. Given that trap servicing intervals were unequal (either 3 or 4 d), fleahopper counts were converted and presented as captures per day in the graphs.

Results and Discussion

Entrances leading into malaise capture containers were frequently blocked by large insects or spider webs, and predation on captured fleahoppers was commonly observed. Consequently, captures were highly variable and it is likely that many counts of captured fleahoppers were not valid. Thus, malaise capture data is not presented. Because similar problems were encountered in the 2002 study, the value of malaise traps for detecting fleahopper movement into cotton appears questionable.

As in 2002, infield traps tended to capture more fleahoppers than those set at the field border, and yellow sticky traps consistently captured more fleahoppers than white traps (Figs. 1-5). However, these differences were less pronounced than in 2002. In contrast to results in 2002, border traps placed at ground level did not consistently capture more fleahoppers than those set at the 1- or 2-m heights, and differences in captures among heights were generally less apparent than those we observed the previous year.

We also observed what appeared to be discrete mass movement events that were not observed in 2002. On 26 April, a weedy pasture upwind and adjacent to the field near Mumford, TX was mowed. On the succeeding 28 April trap servicing date, fleahopper captures at the 2-m trap height were substantially greater than those at the other heights for both trap colors (Fig. 1). These captures likely represented fleahoppers dispersing en masse from the mowed pasture, which was previously observed to harbor a substantial infestation of fleahoppers. A similar capture pattern was detected on 12 May in three other fields (> 10 km apart), and may again have indicated a discrete mass movement event (Fig. 2-4). In neither case was movement reflected in captures by the infield traps, which suggests that during dispersal events, fleahoppers may not necessarily move directly into cotton. Subsequent examination of weather data revealed that a major frontal system passed through the area on 11 May. Although the timing of mass movement relative to the frontal passage may have been coincidental, this observation suggests that relationships between weather events and fleahopper movement deserve further investigation.

In summary, our observations indicated malaise traps offer limited potential for monitoring fleahopper movement. In contrast, commercially available sticky traps show considerable promise for this use. Based solely on the magnitude of captures, yellow sticky traps appear superior to white traps. Furthermore, observations this year suggest that border traps, particularly at the 2-m, height may be useful for detecting mass migrations of fleahoppers, whereas infield traps may be more useful for detecting resident fleahoppers. More importantly, our results identify several trap operational parameters that should be considered in development of a trap-based fleahopper monitoring system and suggest continued investigation is warranted.

Acknowledgments

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Disclaimer

Mention of trade names or commercial products in this article is solely for the purpose of providing specific information and does not imply recommendation or endorsement by the U.S. Department of Agriculture.

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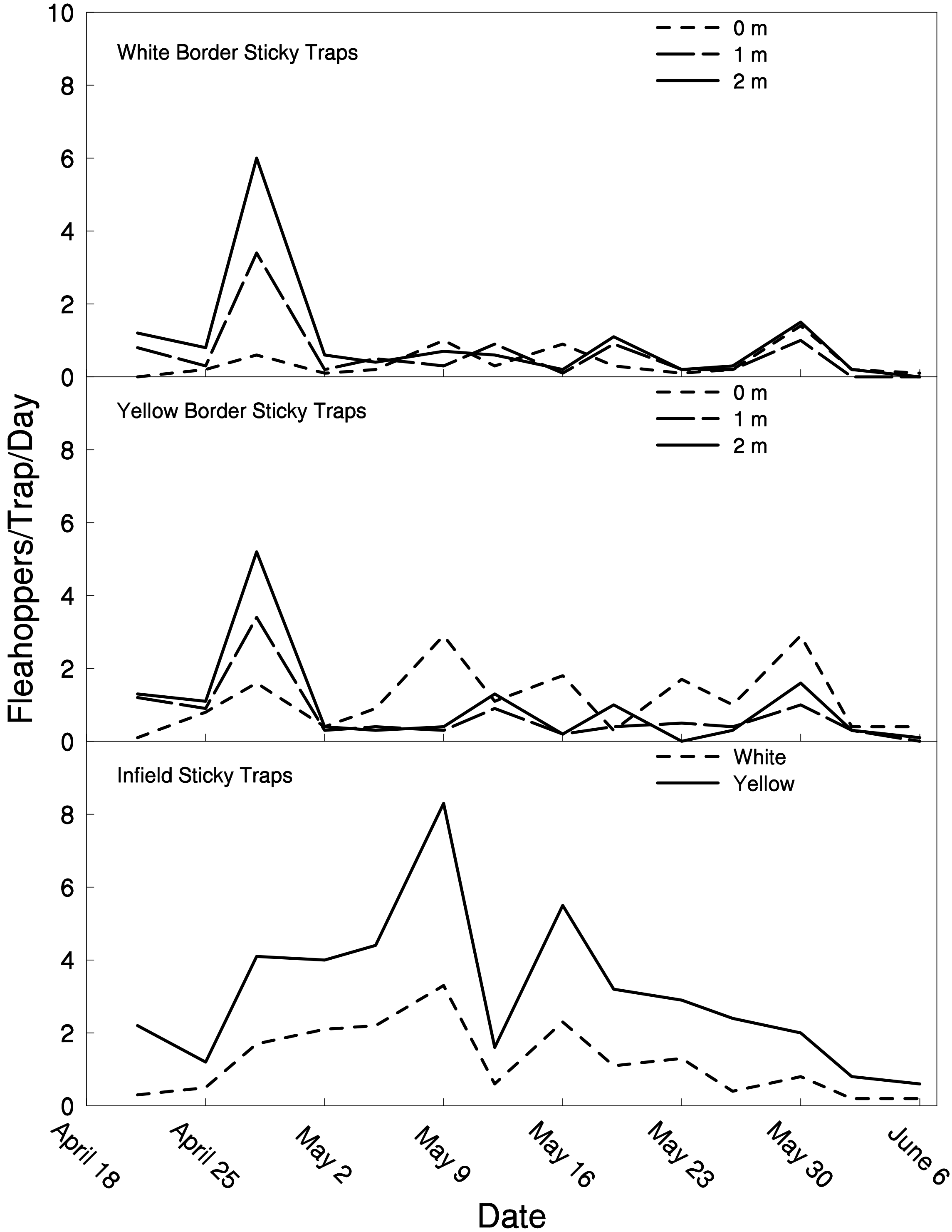

Figure 1. Mean captures of cotton fleahoppers on sticky traps placed at three heights on the field border, and above the plant canopy in a cotton field near Mumford, TX, 2003.

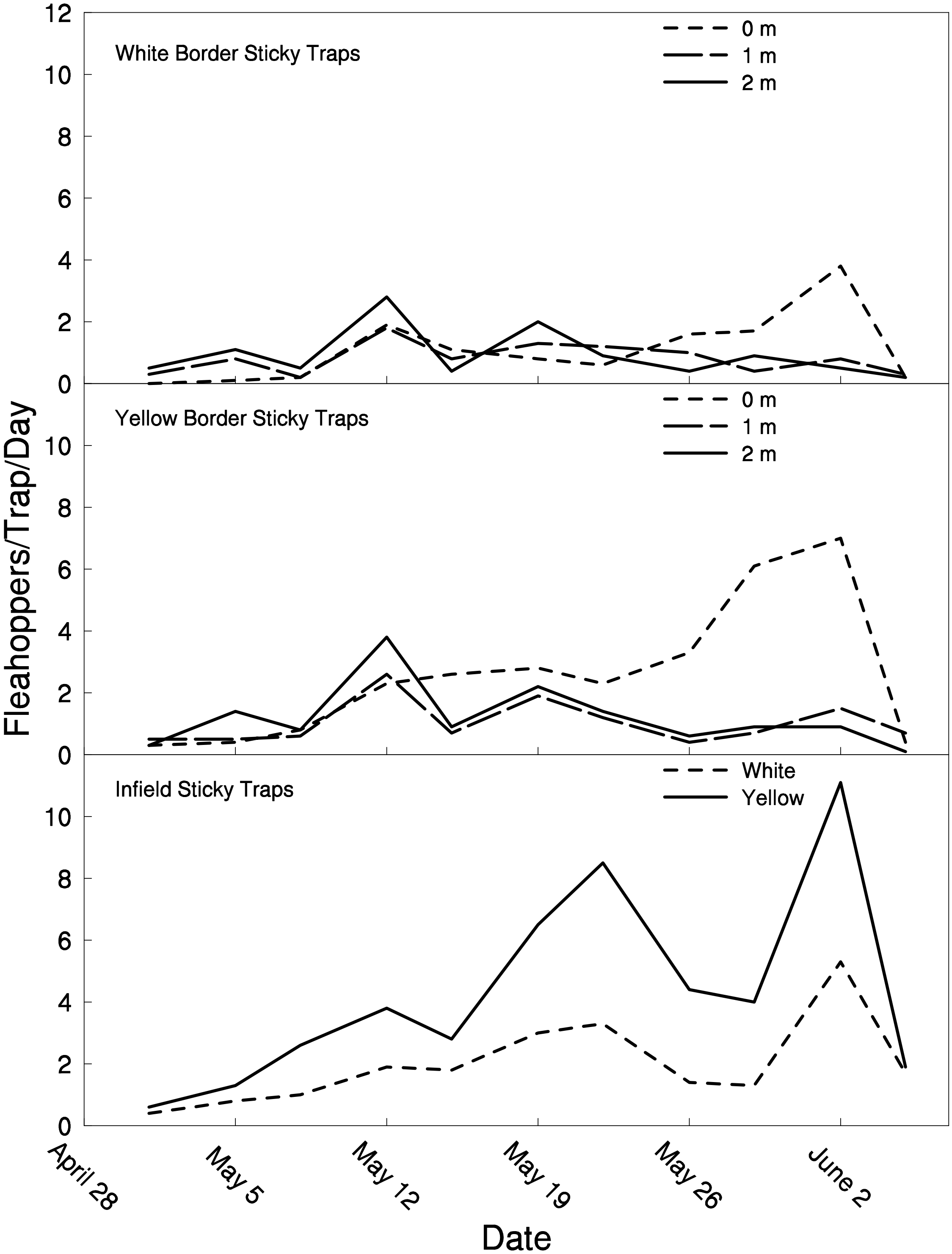

Figure 2. Mean captures of cotton fleahoppers on sticky traps placed at three heights on the field border, and above the plant canopy in a cotton field near Snook, TX, 2003.

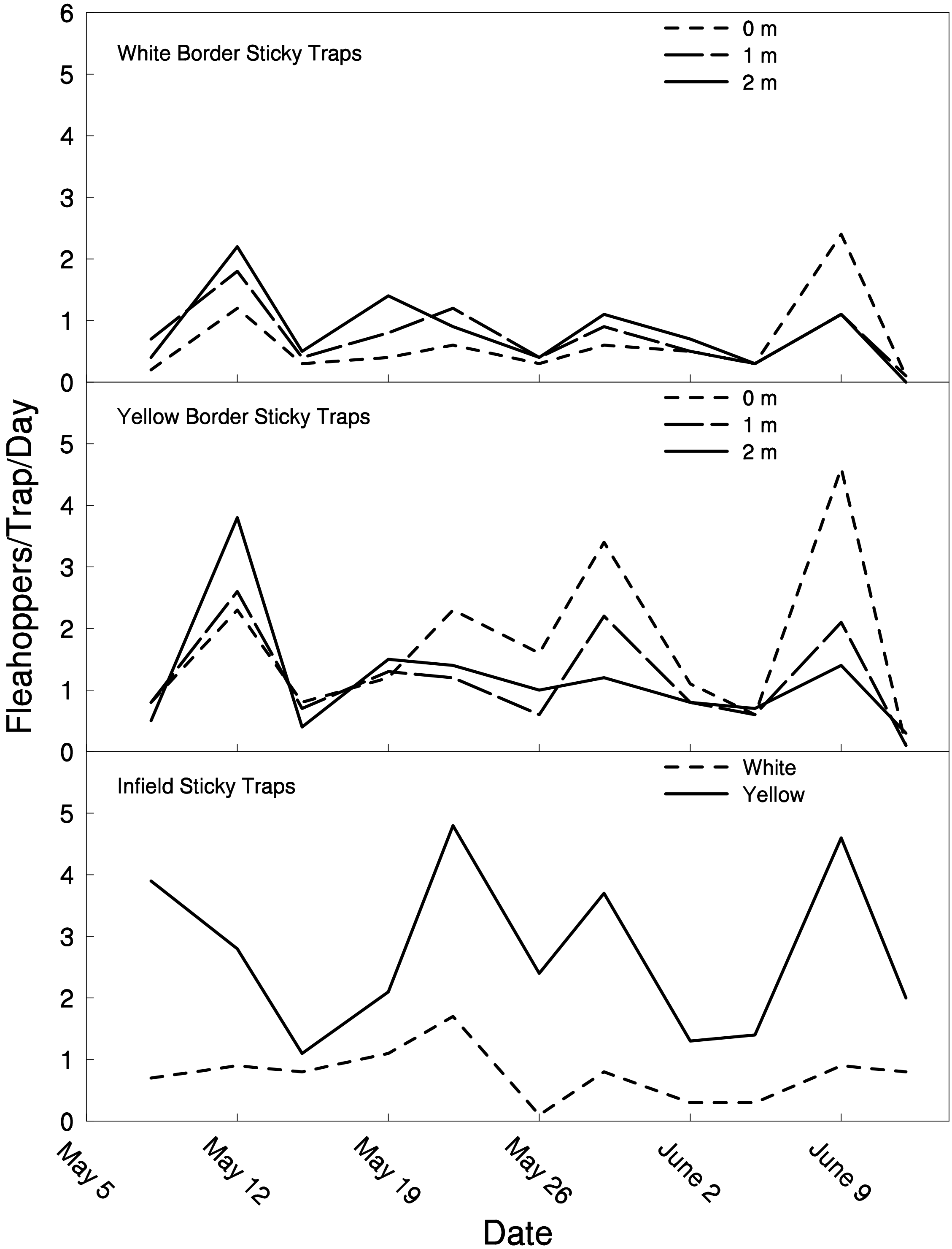

Figure 3. Mean captures of cotton fleahoppers on sticky traps placed at three heights on the field border, and above the plant canopy in a cotton field near College Station, TX, 2003.

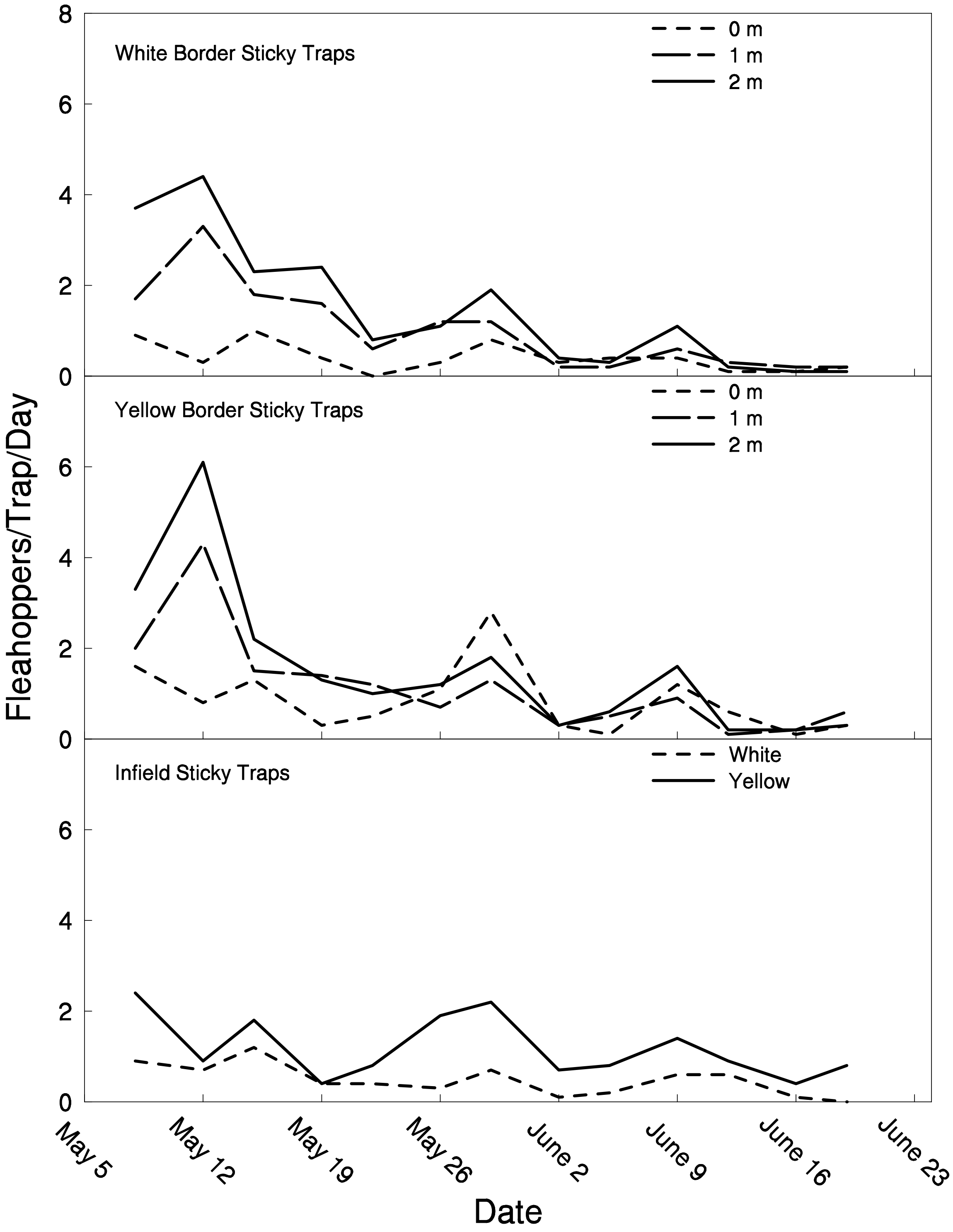

Figure 4. Mean captures of cotton fleahoppers on sticky traps placed at three heights on the field border, and above the plant canopy in a cotton field near Hearne, TX, 2003.

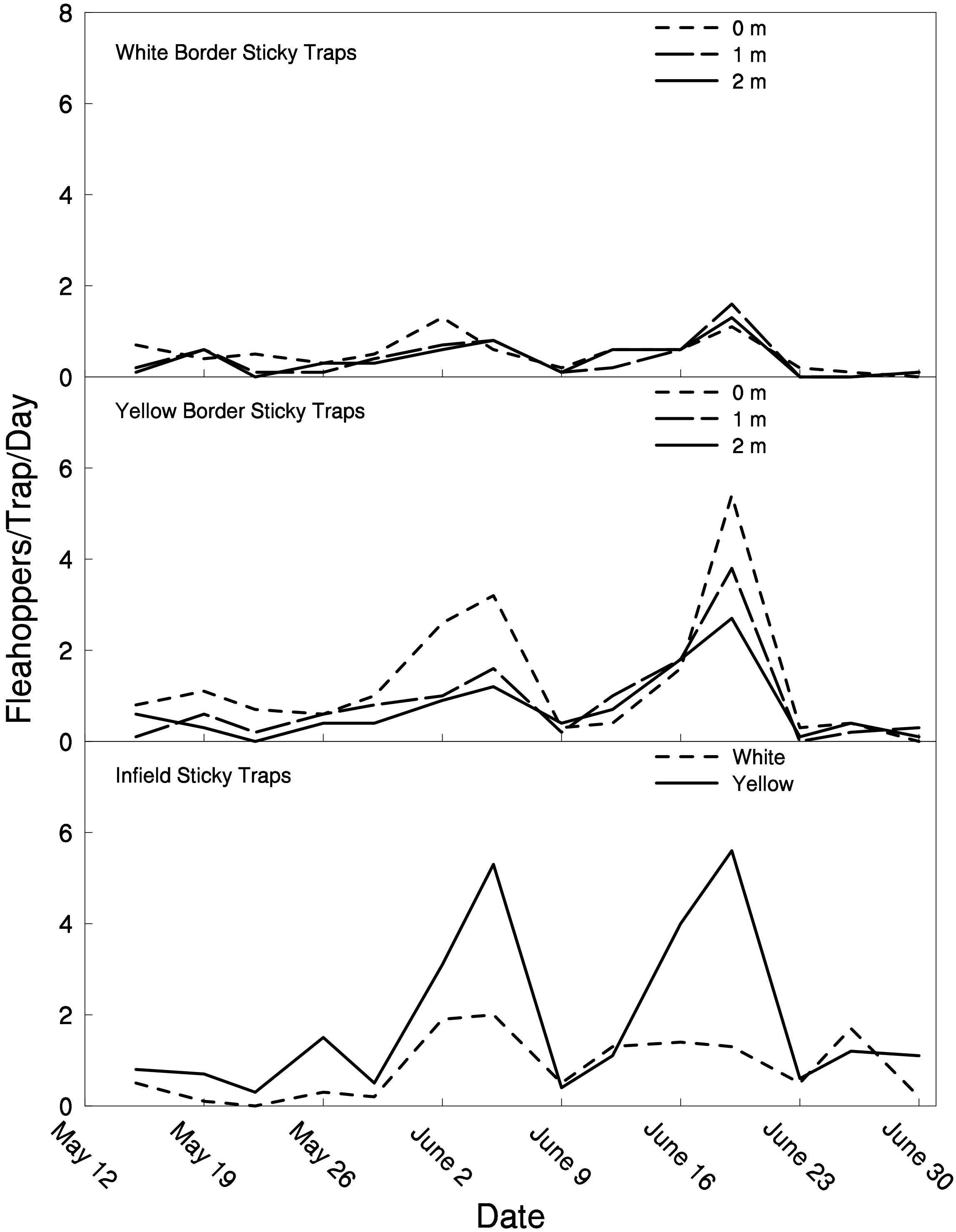

Figure 5. Mean captures of cotton fleahoppers on sticky traps placed at three heights on the field border, and above the plant canopy in a cotton field near Dallas, TX, 2003.